The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HERFRIED LAMMER

Appeal No. 2004-1284
Application No. 09/918,437

ON BRIEF

Before WALTZ, RUGGIERO, and TIMM, **Administrative Patent Judges.**

WALTZ, **Administrative Patent Judge.**

DECISION ON APPEAL

This is a decision on an appeal from the primary examiner's final rejection of claims 1 through 14, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 134.

According to appellant, the invention is directed to a racket for ball sports where the racket includes a racket frame and a self-powered piezoelectric damping system (Brief, page 2). The self-powered piezoelectric damping system includes at least one transducer element and at least one circuit electrically connected to the at least one transducer element (*id.*).

Appellant states that the claims should be considered in three groups (Brief, page 3). However, appellant only presents specific, substantive arguments for the separate patentability of claims 1 and 6 (e.g., Brief, pages 7-8). To the extent appellant has presented arguments for these individual claims, we consider the claims separately. See 37 CFR § 1.192(c)(7)(2002); *In re McDaniel,* 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002). Representative independent claim 1 is reproduced below:

1. A racket comprising:
a racket frame comprising a racket handle portion orientated along a longitudinal axis of the racket, a racket head portion allowing for the attachment thereto of generally longitudinally directed strings and generally laterally directed strings to form a string bed of the racket, and a racket throat area joining the handle portion with the head portion; and
a self-powered piezoelectric damping system comprising at least one transducer element laminated to the racket frame and at least one circuit located within the racket handle portion and electrically connected to the at least one transducer element.

The examiner has relied upon the following references as evidence of obviousness:

Vandergrift	5,775,715	Jul. 07, 1998
Lazarus et al. (Lazarus)	5,857,694	Jan. 12, 1999
Hagood, IV et al. (Hagood)	5,869,189	Feb. 09, 1999

The claims on appeal stand rejected under 35 U.S.C. § 103(a) as unpatentable over Vandergrift in view of Lazarus and Hagood (Answer, page 3). We *affirm* this ground of rejection essentially

for the reasons stated in the Answer and those reasons set forth below.

OPINION

The examiner finds that Vandergrift discloses that it was known in this art to use a piezoelectric system as a vibration damping device inserted into a ski (Answer, page 3). The examiner recognizes that Vandergrift fails to disclose use of this system in tennis rackets, nor does this reference disclose a self-powered piezoelectric system (Answer, sentence bridging pages 3-4). The examiner cites Lazarus for the teaching that piezoelectric materials were known to be useful in both skis and tennis rackets for the purpose of vibration damping (Answer, page 4). The examiner cites Hagood for the teaching that self-powered piezoelectric systems were known in the art for their ability to be easily connected to the control electronics even when embedded in a large structural component and have compatibility with standard structural composites without reducing mechanical performance (*id.*).

From these findings, the examiner concludes that it would have been obvious to one of ordinary skill in this art to employ the self-powered piezoelectric system of Hagood for the system disclosed by Vandergrift, for its attendant benefits as discussed

above, employing this system in the frame of a tennis racket for vibration damping as taught by Lazarus (Answer, page 4). We agree.

Appellant argues that the cited prior art does not disclose or suggest a piezoelectric damping system "including a circuit located within a racket handle portion." Brief, sentence bridging pages 4-5. Appellant argues that Vandergrift and Hagood are completely devoid of any teaching or suggestion of a racket, while the racket disclosed in Figures 10 and 10A of Lazarus does not include a circuit electrically connected to the piezoelectric elements (Brief, page 5; Reply Brief, pages 1-2).

These arguments are not persuasive. Although technically appellant is correct that Lazarus does not depict the circuitry in Figures 10 and 10A, we agree with the examiner (Answer, page 4, last paragraph, and page 6) that Lazarus discloses circuitry within the racket itself as well as locating the piezoelectric elements within the handle. See the abstract of Lazarus, where it is taught that "a circuit [is] attached to the electroactive [piezoelectric sheet] element." Furthermore, Lazarus teaches that "the shunt circuit is connected to the electroactive elements via flex-circuits which, together with epoxy and spacer material, form an integral damper assembly" (col. 9, ll. 45-47).

Lazarus also provides numerous teachings to enable one of ordinary skill in this art to determine the optimum location of the piezoelectric elements within the racket, including the handle portion (col. 3, ll. 9-11; col. 3, ll. 47-49; col. 4, ll. 64-67; col. 12, ll. 44-63; and col. 13, ll. 19-41). One of ordinary skill in the art of sports equipment damping assemblies would also have been guided by the teaching of Vandergrift regarding the location of the piezoelectric damper (col. 6, ll. 8-14).

Appellant argues that the design of a circuit for a self-powered piezoelectric damping system that is small enough to fit within, and be protected within, the handle portion of a racket is an aspect that is not disclosed or suggested by the prior art (Brief, page 6; Reply Brief, page 2). This argument is not well taken for reasons noted above, namely that Lazarus specifically discloses locating the piezoelectric elements with their associated circuits within the handle portion of the racket. We note that appellant discloses the establishment of electrical connections by use of a "flex circuit," as does Lazarus (specification, page 9, ¶[053]; Lazarus, col. 9, ll. 43-47).

Appellant argues that Lazarus discloses a racket having piezoelectric elements located within the core of the racket

frame, but does not disclose these elements laminated to the racket frame (Brief, sentence bridging pages 6-7). This argument is not persuasive since Lazarus teaches that the piezoelectric element "is attached to the implement" (abstract), as shown in Figure 10 (col. 14, ll. 13-19). Lazarus further teaches that the piezoelectric elements are "embedded in or attached to these structures" (col. 2, ll. 21-22), and "may attach to the handle or head of a racquet" to enhance handling characteristics, feel and performance (col. 3, ll. 47-50). While Lazarus teaches that the exact location and positioning of the piezoelectric element is important (col. 4, ll. 64-67), the reference also teaches that "by placing the element directly in contact with or embedded in the internal structure layer **35**, a highly efficient coupling of strain energy" is obtained (col. 8, ll. 5-10). Accordingly, we agree with the examiner (Answer, page 6) that a racket with piezoelectric elements attached would have been obvious in view of the combined cited prior art, regardless of the method of attachment.

With regard to claim 6 on appeal, appellant argues that Lazarus discloses a racket having piezoelectric elements located within the core of the frame but does not disclose a circuit affixed within a slot in the handle portion of the racket (Brief,

page 8). This argument is not well taken since Lazarus teaches that the piezoelectric element may be embedded in a recess (i.e., slot) so the element is not subject to damage, and produces a highly efficient coupling of strain energy while allowing a high degree of structural stiffness (col. 7, l. 63-col. 8, l. 10). Furthermore, Vandergrift teaches locating the piezoelectric damper within a recess to retain the smooth surface of the sports implement while providing an efficient load path to transfer strain energy from the reinforced layer into the piezoelectric damper (col. 5, ll. 50-53; col. 6, ll. 26-33). Accordingly, locating the circuitry within a recess or slot within the handle, whether the piezoelectric element was located on the racket frame or the handle, would have been suggested from the teachings of Lazarus and Vandergrift.

Appellant argues that the examiner has provided no motivation to combine Hagood and Lazarus (Reply Brief, page 2). This argument is not well taken since the examiner explicitly provides the motivation for the combination of Hagood with the other references (Answer, page 4). With respect to the combination of Hagood with Lazarus for the teaching of lamination in Hagood, we note that the examiner does not rely upon this feature of Hagood in the Answer. Furthermore, as discussed

above, the lamination of the piezoelectric elements does not alter the racket product *as claimed*, and regardless the method of attachment would have been well within the ordinary skill in this art.

For the foregoing reasons and those stated in the Answer, we determine that the examiner has established a *prima facie* case of obviousness in view of the reference evidence. Based on the totality of the record, including due consideration of appellant's arguments, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of section 103(a). *See In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Accordingly, the rejection of claims 1-14 under 35 U.S.C. § 103(a) over Vandergrift in view of Lazarus and Hagood is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

THOMAS A. WALTZ
Administrative Patent Judge

JOSEPH F. RUGGIERO
Administrative Patent Judge

CATHERINE TIMM
Administrative Patent Judge

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